COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT

Plant Pathology Fact Sheet PPFS-AG-F-09

Managing Diseases of Alfalfa

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Introduction

Alfalfa can be a vigorous and productive forage crop for Kentucky farmers. Like all farm crops, however, alfalfa is subject to infectious diseases that can limit forage production. Managing these diseases is an important part of economical alfalfa production.

Alfalfa diseases can cause reduced forage yield, reduced forage quality, and decreased stand persistence. Sometimes, the effects of infectious diseases can be dramatic, such as sudden stand loss in a fall-seeded crop caused by Sclerotinia crown and stem rot. Often, the effects of diseases on alfalfa are more subtle but no less important. For example, alfalfa plants with Phytophthora root rot sometimes regrow slowly following cutting, resulting in a stunted stand showing no other obvious symptoms of disease.

Other diseases like bacterial wilt can kill a few scattered plants between each cutting. Over a period of a few seasons, this can result in a gradual yet substantial loss in plant stand. Also, several diseases predispose alfalfa to winter injury, such as crown rot diseases and Phytophthora root rot. In some cases, stand loss during winter may be blamed on winterkill when an infectious disease ultimately may be involved.

Types of Alfalfa Diseases

Seedling Diseases

Fungal infection of roots and stems of very young seedlings can cause sudden wilting and collapse (damping-off) of seedlings. Seedlings that are several weeks old at the time of root infection may become stunted or even killed, but still remain erect (seedling blight, Figure 1). Significant stand loss can result from a severe epidemic of a seedling disease. A variety of infectious fungi can cause seedling diseases of alfalfa in Kentucky.

Figure 1. Phytophthora seedling blight

Leaf Spots and Shoot Blights

Invasion of leaves by disease-causing microorganisms (pathogens) can produce discrete dead spots on foliage (Figure 2). Leaves with a great number of spots are less effective at photosynthesis, which can result in reduced plant growth. Also, leaves with spot symptoms often drop to the ground, resulting in reduced forage yield and quality.

Figure 2. Common (Pseudopeziza) leaf spot

Many of the fungi and bacteria that infect leaves also infect stems of alfalfa. Often, stem infections prevent water flow to the rest of the shoot, causing sudden wilting and desiccation (blight). Lepto leaf spot, spring black stem, and Stemphylium leaf spot are common alfalfa diseases that cause spotting of leaves. Anthracnose, Rhizoctonia stem blight, Sclerotinia crown and stem rot, and spring black stem cause blighting of shoots.

Figure 3. Phytophthora root rot

Root Rots

Root rot diseases may be caused by a variety of fungi. Following infection, roots decay and they no longer function in removing water and nutrients from the soil. Above ground, affected plants may exhibit stunting, yellowing or reddening, and wilting. Also, some root rot diseases can make alfalfa more susceptible to winter injury. Phytophthora root rot is a common root rot disease of alfalfa grown in Kentucky (Figure 3).

Figure 4. Bacterial wilt

Wilts

Certain fungi and bacteria infect the water-conducting tissues of alfalfa plants without causing any noticeable root rot. While roots may appear fine superficially, infection of the water-conducting tissues of roots and stems prevents water flow to leaves. This results in wilting of shoots and eventual death of infected plants (Figure 4). Bacterial wilt and Fusarium wilt are two common wilt diseases of alfalfa.

Crown Rots

A great variety of fungi can infect the crown (the portion of the taproot just below the soil line) of alfalfa plants (Figure 5). Alfalfa plants store food reserves for winter in their crowns and crown rot diseases interfere with this process, making plants more susceptible to winter injury.

Figure 5.
Mycoleptodiscus crown rot

Disease Management

Most disease-control decisions for alfalfa are made before diseases are visibly apparent. For several alfalfa diseases, once the symptoms appear, little can be done to control the disease. Therefore, careful planning is necessary to keep alfalfa diseases from building up to damaging levels. As with most crop diseases, alfalfa diseases are most effectively managed by integrating as many control methods as practical. With the exception of seed treatment, alfalfa diseases cannot be controlled economically using commercial fungicides. Control practices include:

Crop Rotation

Most alfalfa pathogens do not survive well in the absence of a host plant. As infested alfalfa residues decompose, pathogen cells become exposed to the soil, where they die out. Therefore, rotating to another crop for several years can help reduce pathogen populations in the field, particularly if rotating to a crop other than red clover. Corn, small grains, soybeans, or forage grasses are good rotation crops for reducing populations of alfalfa pathogens.

Site Selection and Preparation

Alfalfa is most vigorous when growing on deep, well-drained soils. Increased plant vigor can result in increased resistance to some diseases. Also, several root rot fungi are more active in poorly drained soils, so choosing a well-drained site helps to reduce root rot diseases. Preparing a fine but firm seedbed can provide an environment favorable for plant growth and unfavorable for pathogens.

High-Quality Seed

Several pathogens of alfalfa can be transmitted in infected seed. Therefore, it is advisable to use only high-quality, certified seed. Plump, high-quality seed will produce vigorous stands with less loss from seedling diseases. Remember, alfalfa stand density will always decline with time, so it is important to start out with a good stand of seedlings. See the Cooperative Extension publication *Alfalfa, Queen of the Forage Crops* (AGR-76) for information on seeding rates. Seed treatment with the fungicide Apron® or Apron XL® may improve stand establishment, particularly where alfalfa is being grown with little or no rotation to other crops. Another option is to choose coated alfalfa seed that has been treated with a fungicide (this information will be on the seed bag label).

Resistant Varieties

For several diseases, selection of resistant varieties is the most important means of disease control. Bacterial wilt, anthracnose, Phytophthora root rot, and Fusarium wilt are important diseases that can be controlled using resistant varieties. Plant only varieties with a "moderate resistance" (MR) rating (or higher) to each of these diseases. An even higher level of resistance is recommended on farms where these diseases have been diagnosed, or in fields where alfalfa is being grown with little or no crop rotation. Contact your Extension agent, or refer to the UK Forage Variety Trials Web page, for information on alfalfa varieties tested in Kentucky and their disease ratings.

Balanced Soil Fertility

Maintaining an appropriate soil pH and adequate levels of nutrients is important for promoting vigorous growth, which helps the plant resist diseases and winter injury. Have a soil sample tested to determine lime and fertilizer requirements. See *Fertilizer Management in Alfalfa* (AGR-210) for more information on alfalfa fertility.

Harvest Management

- *Cut alfalfa at the late-bud to early-flower stage—*

Cutting alfalfa before the late-bud stage prevents plants from storing adequate food reserves for regrowth, thus weakening plants. Postponing cutting much past the late-bud/early-flower stage gives foliar diseases time to build up and cause defoliation. Timely cutting, before significant defoliation occurs, helps to avoid losses in yield and quality caused by foliar diseases. It also helps protect future cuttings by reducing the accumulation of pathogen-infested leaves on the soil surface.

- *Cut only when foliage is dry—*

Cells and spores of several infectious fungi and bacteria can be spread in droplets of water on cutting equipment. Waiting until foliage is dry before cutting can reduce the spread of pathogens.

- *Harvest young stands before older ones—*

Older stands of alfalfa have had more time for diseases to build up than younger stands. Cut younger stands before older ones to reduce the chance of spreading pathogens to young stands, and then clean equipment between harvests. Thorough and rapid cleaning can be accomplished using a high-pressure hose. For greatest sanitation, disinfect the cutter bar with steam.

- *Remove hay promptly—*

During warm, wet weather, some pathogens can spread from hay curing in the field to the newly developing alfalfa shoots underneath the swath. In circumstances where hay has not cured completely but warm, wet weather is expected, it may be best to treat with a hay preservative and bale earlier. See *Hay Preservatives* (ID-46) for more information.

- *Allow adequate growth before freezedown—*

Alfalfa needs 4 to 6 weeks of regrowth between the final harvest and freezedown. This is necessary in order to have sufficient root reserves to withstand winter weather and to resist crown rot infections during the dormant season. Following freezedown, the forage can be harvested or grazed as desired.

Control Insects and Weeds

Several insects create wounds that allow crown rot fungi and wilt pathogens to invade alfalfa plants. Weeds can also aggravate some diseases, if growth is dense and rank. Dense weed growth reduces air circulation and slows drying of foliage, making conditions more favorable for diseases of leaves and stems.

Minimize Crown Injury

Injuries to the crown provide infection sites for crown rot fungi. Avoid practices that injure crowns, such as grazing or using heavy equipment, when the soil is wet.

Additional UK Resources

Web Sites

Plant Pathology Extension Publications on Forage Diseases & Their Management
http://www2.ca.uky.edu/agcollege/plantpathology/extension/pubs.html#Forages

Forage Variety Trials
http://www.uky.edu/Ag/Forage/ForageVarietyTrials2.htm.

Publications

Alfalfa, Queen of the Forage Crops (AGR-76)
http://www2.ca.uky.edu/agc/pubs/agr/agr76/agr76.pdf

Fertilizer Management in Alfalfa (AGR-210)
http://www2.ca.uky.edu/agc/pubs/AGR/AGR210/AGR210.pdf

Grazing Alfalfa (ID 97)
http://www2.ca.uky.edu/agc/pubs/id/id97/id97.pdf

Hay Preservatives (ID-46)
http://www2.ca.uky.edu/agc/pubs/id/id46/id46.htm

Understanding Forage Quality
http://www.uky.edu/Ag/Forage/ForageQuality.pdf

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Photos: Paul Vincelli, University of Kentucky (figure 1); Erik Stromberg, Virginia Polytechnical Institute, Bugwood.org (figure 2); and unknown source (figures 3, 4 & 5)

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